* NOTICES *

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Bibliography

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(19) [Publication country] Japan Patent Office (JP)
(12) [Kind of official gazette] Open patent official report (A)
(11) [Publication No.] JP,11-296727,A
(43) [Date of Publication] October 29, Heisei 11 (1999)
(54) [Title of the Invention] Automatic vending machine
(51) [International Patent Classification (6th Edition)]

G07F 9/00 107
11/42

[FI]

G07F 9/00 107 A
11/42

[Request for Examination] Un-asking.
[The number of claims] 1
[Mode of Application] OL
[Number of Pages] 8
(21) [Application number] Japanese Patent Application No. 10-95526
(22) [Filing date] April 8, Heisei 10 (1998)
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[Patent Attorney]
[Name] Sakaguchi Yoshihiko

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Epitome

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(57) [Abstract]
[Technical problem] Two or more shelf spaces by which separated spacing mutually and the laminating was carried out up and down, and goods expenditure equipment which pays goods out of a shelf space, The 1st transport device which receives the goods paid out of the shelf space, and conveys goods below, The 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, It is an automatic vending machine equipped with the control unit which controls actuation of goods expenditure equipment, actuation of the 1st transport device, and actuation of the 2nd transport device. When a power source is shut off by the 1st transport device, and it is shut off by the 2nd transport device while conveying goods while conveying goods or, the automatic vending machine which does not produce the trouble at the time of a power-source reclosing is offered.
[Means for Solution] Two or more shelf spaces by which separated spacing mutually and the laminating was carried out up and down, and goods expenditure equipment which pays goods out of a shelf space, Having the control unit which controls the 1st transport device which receives the goods paid out of the shelf space, and conveys goods below, the 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, and actuation of goods expenditure equipment, actuation of the 1st transport device and actuation of the 2nd transport device, a control unit drops the 1st transport device to a power up, and, subsequently operates the 2nd transport device.

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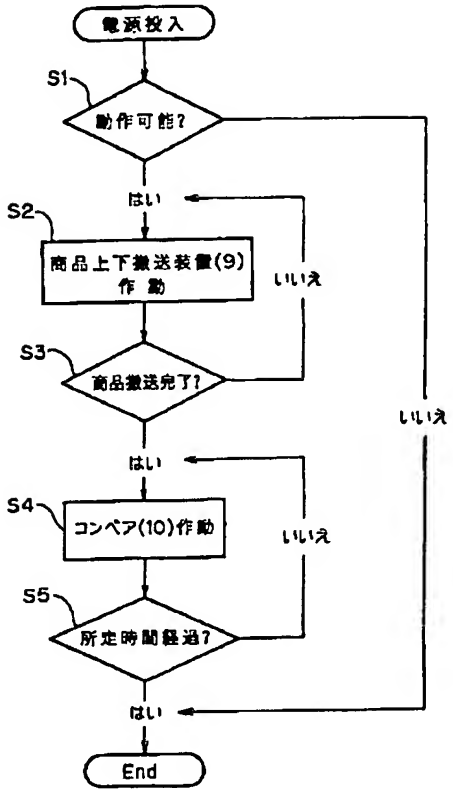

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CLAIMS

[Claim(s)]
[Claim 1] It is the automatic vending machine which a control unit drops the 1st transport device to a power up, and is characterized by subsequently operating the 2nd transport device by having the following. Two or more shelf spaces by which separated spacing mutually and

the laminating was carried out up and down Goods expenditure equipment which pays goods out of a shelf space The 1st transport device which receives the goods paid out of the shelf space, and conveys goods below The control unit which controls the 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, and actuation of goods expenditure equipment, actuation of the 1st transport device and actuation of the 2nd transport device

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Two or more shelf spaces by which this invention separated spacing mutually and the laminating was carried out up and down, and the goods expenditure equipment which pays goods out of a shelf space, The 1st transport device which receives the goods paid out of the shelf space, and conveys goods below, It is related with an automatic vending machine equipped with the control unit which controls the 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, and actuation of goods expenditure equipment, actuation of the 1st transport device and actuation of the 2nd transport device.
[0002]
[Description of the Prior Art] Two or more shelf spaces by which separated spacing mutually and the laminating was carried out up and down, and the goods expenditure equipment which pays goods out of a shelf space, The 1st transport device which receives the goods paid out of the shelf space, and conveys goods below, The 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, In an automatic vending machine equipped with the control unit which controls actuation of goods expenditure

equipment, actuation of the 1st transport device, and actuation of the 2nd transport device When the power source was shut off by the 1st transport device, and it was conventionally shut off by the 2nd transport device while conveying goods while conveying goods or, goods remained remaining on the 1st transport device or the 2nd transport device at the time of a power-source reclosing.

[0003]

[Problem(s) to be Solved by the Invention] If goods remain remaining on the 1st transport device or the 2nd transport device at the time of a power-source reclosing when a power source is shut off by the 1st transport device, and it is shut off by the 2nd transport device while conveying goods while conveying goods or In case the next purchaser by whom two goods are taken out in case the next purchaser from whom a purchaser cannot receive goods after a power-source reclosing purchases goods purchases goods, problems, such as causing trouble to actuation of a transport device, are produced. Two or more shelf spaces by which this invention was made in view of the above-mentioned problem, separated spacing mutually, and the laminating was carried out up and down, The goods expenditure equipment which pays goods out of a shelf space, and the 1st transport device which receives the goods paid out of the shelf space, and conveys goods below, The 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, It is an automatic vending machine equipped with the control unit which controls actuation of goods expenditure equipment, actuation of the 1st transport device, and actuation of the 2nd transport device. When a power source is shut off by the 1st transport device, and it is shut off by the 2nd transport device while conveying goods while conveying goods or, it aims at offering the automatic vending machine which does not produce the trouble at the time of a power-source reclosing.

[0004]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, it sets to this invention. Two or more shelf spaces by which separated spacing mutually and the laminating was carried out up and down, and the goods expenditure equipment which pays goods out of a shelf space, The 1st transport device which receives the goods paid out of the shelf space, and conveys goods below, The 2nd transport device which receives goods from the 1st transport device and conveys goods to goods output port, It has the control unit which controls actuation of goods expenditure equipment, actuation of the 1st transport device, and actuation of the 2nd transport device, a control unit drops the 1st transport device to a power up, and the automatic vending machine characterized by subsequently operating the 2nd transport device is offered. In the automatic vending machine concerning this invention a control unit Since the 1st transport device is dropped to a power up and the 2nd transport device is subsequently operated the goods which are on the 1st transport device or the 2nd

transport device at the time of a power-source reclosing when a power source is shut off by the 1st transport device, and it is shut off by the 2nd transport device while conveying goods while conveying goods or -- the 1st transport device and the 2nd transport device -- or it is conveyed by the 2nd transport device to goods output port. Therefore, in case the next purchaser by whom two goods are taken out in case the next purchaser from whom a purchaser cannot receive goods after a power-source reclosing purchases goods purchases goods, there is no possibility of producing problems, such as causing trouble to actuation of a transport device.
[0005]
[Embodiment of the Invention] The automatic vending machine concerning the example of this invention is explained based on drawing 1 -11. In the following explanation, the direction of the arrow heads I, II, III, IV, V, and VI of drawing 1 -10 is called the front, back, a left, the method of the right, the upper part, and a lower part. As shown in drawing 1 and 2, the automatic vending machine A concerning this example is equipped with the tank 1 where the front face was opened wide. The inner case 2 by which the front face was opened wide is arranged in the tank 1. Heat insulation processing of the inner case 2 is carried out. Opening 2a is formed in the right-hand side wall lower part of an inner case 2. The shutter of the rocking closing motion type which is not illustrated to opening 2a is attached. 1st machine room 3a is formed between the right-hand side walls of an inner case 2 and a tank 1, and 2nd machine room 3b is formed between the bottom walls of an inner case 2 and a tank 1. The door 4 of the rocking type which has the transparent aperture which covers the front face where the inner case 2 was opened wide, and the front face where the 1st and 2nd machine room 3a and 3b was opened wide is attached in the front face of a tank 1. Goods output port 5 is formed in the lower right section of a door 4. The shutter and microswitch of a rocking closing motion type which are not illustrated to goods output port 5 are attached. The goods selector button which is not illustrated is attached in the upper part of the part which stands face to face against 1st machine room 3a of a door 4.
[0006] In the inner case 2, the shelf space 6 by which separated spacing mutually up and down and the laminating was carried out to seven steps is arranged. Two or more goods trains 100 which extend forward and backward are accomplished in each shelf space 6, and goods 200 are laid in it. the shelf space 6 of the maximum upper case -- installation -- the goods expenditure equipment 7 constituted by the motor which carries out the rotation drive of the endless belt which extends forward and backward, and the endless belt, and the piece of ** fixed to the endless belt is arranged above <DP N=0003> **** each goods train 100. the upper part of each goods train 100 laid in each shelf space 6 except the shelf space 6 of the maximum upper case -- and the goods expenditure equipment 7 constituted by the motor which carries out the rotation drive of the endless belt of a shelf space 6 which extends forward and backward caudad and an endless belt right above, and the piece of push fixed to the

endless belt is arranged. Face to face is stood against each goods train 100, and the goods stopper 8 is attached in the front end of each shelf space 6. The goods stopper 8 is attached rockable between the upright position and the location which saw from the method of the right and fell 180 degrees counterclockwise. The goods stopper 8 is standing straight according to the energization force of the spring which is not illustrated at the time of no-load.

[0007] Between the front end of a shelf space 6, and the open end of an inner case 2, the goods vertical transport device 9 constituted by the driving gear of a movable saucer and a saucer up and down is arranged. While the front end of a shelf space 6, and the open end of an inner case 2, the conveyor 10 of the shelf space 6 of the bottom which extends right and left is arranged caudad.

[0008] A coin counter, a coin locker, etc. which are not illustrated in the upper part and the height direction center section in 1st machine room 3a are arranged, and goods expenditure equipment 7, the goods vertical transport device 9, and the control unit that controls actuation of conveyor 10 grade are arranged. The control unit is constituted by ROM, RAM, CPU, an I/O interface, etc. with which the control program was contained. the lower part in 1st machine room 3a -- and the goods receptacle shelf which is not illustrated under the opening 2a of an inner case is arranged. The compressor of the cooling system which is not illustrated in 2nd machine room 3b and a condenser are arranged, and the evaporator is arranged under the shelf space 6 of the bottom in an inner case 2.

[0009] The configuration of the goods vertical transport device 9 is explained in full detail, referring to drawing 3 - drawing 9 . As shown in drawing 3 , and 4, 7 and 8, guide member 9a has extended up and down. It is fixed to the left wall of an inner case 2, and guide member 9a constitutes a part of left wall. Endless belt 9b which extends up and down is attached in guide member 9a. Motor 9c which carries out the rotation drive of the endless belt 9b is attached in the crowning of guide member 9a. Truck guide-rail 9d of the pair which extends up and down adjoins endless belt 9b, and is attached in guide member 9a. Roller-guide 9e of the pair which extends up and down adjoins truck guide-rail 9d, and is attached in guide member 9a. As the lower limit of roller-guide 9e is positioned [of the 2nd shelf space 6] up by whether it is small from the bottom and is shown in drawing 3 and 4, the lower limit section of roller-guide 9e is back crooked at the abbreviation right angle. As shown in drawing 4 , and 7 and 8, 9f of trucks which **** to truck guide-rail 9d is connected with endless belt 9b. 9h of bearings is attached in 9f of trucks. 9h of bearings has flabellate form piece 9hof stop ' whose central angles prolonged to the back slanting upper part are 90 abbreviation, as shown in drawing 4 , and 5, 7 and 8. As shown in drawing 3 , and 4, 7 and 8, bearing-bar 9i by which the left end was fixed to 9f of trucks penetrated 9h of bearings, and has extended to the method of the right horizontally. As shown in drawing 4 and 6, pinhole 9j of a pair faces each other, and is formed in the section near the right end of bearing-bar 9i.

[0010] As shown in drawing 3 , and 4, 7 and 8, where bearing-bar 9i is inserted in the opening-of-the-whole-traffic hole where goods saucer 9k which extends right and left was formed in goods saucer 9k, it is supported by bearing-bar 9i rotatable. Balance weight 9m is attached in the left end of goods saucer 9k. By balance weight 9m existence, at the time of no-load, goods saucer 9k inclines below slightly towards a trailing edge from first transition, as shown in drawing 3 , and 7 and 8. As shown in drawing 4 , and 5, 7 and 8, 9n of hook type stop pawls is formed in balance weight 9m. As shown in drawing 7 and 8, 9n of stop pawls is engaging with piece 9hof stop '. As a broken line shows to drawing 4 and a continuous line shows to drawing 7 and 8, roller 9p which projects to a left in balance weight 9m is attached rotatable. As shown in drawing 7 and 8, as for roller 9p, goods saucer 9k is in contact with roller-guide 9e of the front in roller-guide 9e of a pair, when no-load. Consequently, goods saucer 9k is maintained at the condition of having inclined below slightly towards the trailing edge from first transition at the time of no-load.

[0011] As shown in drawing 4 , and 6, 7 and 9, snap-ring 9r is arranged. Snap-ring 9r has the body and the flange. As shown in drawing 6 , a flange and a part of body are covered, 2 sets of a pair of slits face each other, and are formed, it is inserted into the slit of each set and narrow-width elastic section 9r' is formed. Projection 9r" is formed inside each elastic section 9r'. As shown in drawing 7 and 9, the body of snap-ring 9r was inserted in the right end of the opening-of-the-whole-traffic hole of goods saucer 9k, and has fitted in outside to the right end section of bearing-bar 9i which projects from the right end of said opening-of-the-whole-traffic hole to the method of the right. Projection 9r" formed inside elastic section 9r' fitted into pinhole 9j formed in the section near the right end of bearing-bar 9i, and snap-ring 9r is stopped to bearing-bar 9i.

[0012] As shown in drawing 3 and 7, face to face was stood against guide member 9a, 9s of guide members was arranged, and it has extended up and down. It is fixed to the right-hand side wall of an inner case 2, and 9s of guide members constitutes some right-hand side walls. 9s [of guide sections] ' constituted by the slot which is formed in the heights and heights which extend up and down in 9s of guide members, and extends up and down is formed. The right end of bearing-bar 9i is inserted in the slot of 9s [of guide sections] ' movable up and down.

[0013] Actuation of the automatic vending machine A which has the above-mentioned configuration is explained. A user foresees the internal goods 200 from the transparent aperture of a door 4, chooses the desired goods 200, throws in coin from the coin slot which was formed subsequently to a panel 5 and which is not illustrated, pushes a goods selector button, and specifies the goods train 100 constituted with the desired goods 200. Under control of a control unit, goods saucer 9k of the goods vertical transport device 9 descends from an upper position in readiness rather than the shelf space 6 of the maximum upper case, and

stops in a downward height location more slightly than the shelf space 6 in which the goods train 100 constituted with the desired goods 200 was laid. In addition, when goods saucer 9k of the goods vertical transport device 9 is at least in upper standby rather than the shelf space 6 of the maximum upper case, 9f of trucks contacts the microswitch which was attached in guide member 9a and which is not illustrated, and they are changing the microswitch concerned into ON condition. If 9f of trucks descends and goods saucer 9k descends from a position in readiness, the contact to 9f of trucks and said microswitch is canceled, and said microswitch will be in an OFF condition. A control device detects whether goods saucer 9k is in a position in readiness by ON of said microswitch, and OFF. When goods saucer 9k is not in a position in readiness by a certain cause, once a control unit returns goods saucer 9k to a position in readiness, it is dropped. Halt position control of goods saucer 9k is performed to accuracy by comparing with the enumerated data of the encoder corresponding to the location of each shelf space the enumerated data of the encoder attached in motor 9c.

[0014] If it stops in a downward height location more slightly than the shelf space 6 in which the goods train 100 which goods saucer 9k consisted of with the desired goods 200 was laid The goods expenditure equipment 7 of the right above of this goods train 100 operates under control of a control unit, the piece of push which contacts from back the goods 200 located in the tail end of the goods train 100 moves only the distance for one goods to the front, and only the distance for one goods extrudes the goods train 100 to the front. The forefront goods 200 push down the upright goods stopper 8 against the spring force which energizes the goods stopper 8, and fall from the first transition of a shelf space 6. The goods 200 which fell are caught by goods saucer 9k of the goods vertical transport device 9.

[0015] As a continuous line shows to drawing 10 , at the time of no-load, by balance weight 9m existence, goods saucer 9k is seen from the method of the right around bearing-bar 9i, rotates clockwise, and when roller 9p contacts at roller-guide 9e of the front in roller-guide 9e of a pair, it inclines below slightly toward a trailing edge from first transition. If goods 200 ride on goods saucer 9k, as an alternate long and short dash line shows to drawing 10 , counterclockwise rotation HE rotation is seen and carried out from the method of the right with the weight of goods 200, roller 9p will contact roller-guide 9e of the back in roller-guide 9e of a pair, and goods saucer 9k will extend at an abbreviation horizontal. Consequently, goods 200 are stabilized and are supported by goods saucer 9k. What it was detected by the photosensor which is not illustrated that goods 200 fell from the first transition of a shelf space 6, as a result goods 200 paid out of the shelf space 6 to the goods vertical transport device 9 by it is detected. A detection signal is sent to a control unit.

[0016] A control unit makes descent of goods saucer 9k of the goods vertical transport device 9 start, after receiving a goods expenditure detection signal from a photosensor. Goods saucer 9k descends put goods 200 and extended at an abbreviation horizontal. Since the posture on

goods saucer 9k of goods 200 is stable, there is no possibility that goods 200 may fall from goods saucer 9k during descent of goods saucer 9k. From the bottom, slightly, goods saucer 9k will stop, if it descends to the upper location of the 2nd shelf space 6. In this height location, since the lower limit section of roller-guide 9e is back crooked at the abbreviation right angle, roller 9p loses a support. Consequently, with the weight of goods 200, around bearing-bar 9i, goods saucer 9k is seen from the method of the right, and rotates counterclockwise. If goods saucer 9k rotates 90 abbreviation, as a two-dot chain line shows to drawing 10 , roller 9p will contact roller-guide 9e of the front in roller-guide 9e of a pair, and rotation of goods saucer 9k will stop. Goods 200 fall from goods saucer 9k which extends in an abbreviation vertical towards first transition from a trailing edge. By balance weight 9m existence, around bearing-bar 9i, goods saucer 9k which lost the load is seen from the method of the right, and rotates to a clockwise rotation. As a broken line shows to drawing 10 , roller 9p contacts the part in which roller-guide 9e of the front in roller-guide 9e of a pair carried out back HE crookedness, and rotation of goods saucer 9k stops.

[0017] Goods saucer 9k of the goods vertical transport device 9 goes up to a position in readiness under control of a control unit. In case it goes up, goods saucer 9k is seen from the method of the right, and rotates to a clockwise rotation, roller 9p carries out front HE migration, contacting the part in which roller-guide 9e of the front in roller-guide 9e of a pair carried out back HE crookedness, and it contacts soon the part which extends in the vertical of roller-guide 9e of the front in roller-guide 9e of a pair. the first transition at the time of no-load [which rotation of goods saucer 9k stops at this time, and shows goods saucer 9k to drawing 10 as a continuous line] -- a knife -- it will be in the condition of having inclined below slightly towards the trailing edge. Goods saucer 9k remains in this location, after arriving at a position in readiness.

[0018] After goods saucer 9k descends to the upper location of the 2nd shelf space 6 slightly and stops from the bottom, a conveyor 10 carries out predetermined time actuation under control of a control device. The goods 200 which fell from goods saucer 9k are caught by conveyor 10, and are conveyed towards opening 2a. Goods 200 pass along opening 2a, and fall on goods receptacle shelving arranged under the opening 2a. A user takes out the goods 200 of goods receptacle shelving through goods output port 5. In case goods 200 are taken out, the shutter which was attached in goods output port 5 and which is not illustrated rocks, and the microswitch which is not illustrated operates. Thereby, a control unit detects what goods output port was able to open.

[0019] The goods 200 paid out of the shelf space 6 with goods expenditure equipment 7 when the goods 200 laid in the 2nd step of shelf space 6 were chosen fall on the direct conveyor 10 through goods saucer 9k of the goods vertical transport device 9 from under the goods 200 laid in the shelf space 6 of the bottom, and by conveyor 10, even a goods receptacle shelf is

conveyed and it is taken out through goods output port 5.

[0020] In the automatic vending machine A concerning this example, when a power source is switched on, actuation of the goods vertical transport device 9 and actuation of a conveyor 10 are controlled as follows. As shown in the control flow chart of drawing 11 , if the power source of an automatic vending machine A is switched on, a control unit confirms whether the door 4 has closed or the shutter attached in goods output port 5 has closed, and whether the goods vertical transport device 9 and a conveyor 10 can operate and after it checks (S1), it will operate the goods vertical transport device 9. A control unit drops goods saucer 9k from the bottom to the location of the upper part slightly of the 2nd shelf space 6, when goods saucer 9k is in a power up in a position in readiness, when goods saucer 9k is not in a position in readiness at a power up, it once drops goods saucer 9k after position-in-readiness HE ****** from the bottom to the location of the upper part slightly of the 2nd shelf space 6, and it carries out goods fall actuation. It is detected by the enumerated data of the encoder attached in motor 9c that goods saucer 9k descended from the bottom to the location of the upper part slightly of the 2nd shelf space 6, as a result that goods conveyance by the goods vertical transport device 9 was completed (S2, S3). a control device is enough for taking out of goods 200 in a conveyor 10, after goods conveyance by the goods vertical transport device 9 is completed -- predetermined time actuation is carried out (S4, S5). A control device is parallel to operating a conveyor 10, and returns goods saucer 9k to a position in readiness. If goods 200 appear in the power up at goods saucer 9k of the goods vertical transport device 9 as a result of the above-mentioned control, conveyor 10 HE migration will be carried out from goods saucer 9k, and goods 200 will be conveyed even to a goods receptacle shelf by conveyor 10. If goods 200 appear in the conveyor 10 at the power up, goods 200 will be conveyed even to a goods receptacle shelf by conveyor 10.

[0021] In an automatic vending machine A, the goods 200 by the purchaser are purchasing temporarily, and even if it is the case where a power source is shut off during conveyance of the goods 200 under conveyance of the goods 200 by the goods vertical transport device 9, or by the conveyor 10, a purchaser can take out goods 200 through goods output port 5 after a power-source reclosing. Moreover, the next goods purchaser who is going to purchase goods does not take out two goods through goods output port 5 after a power-source reclosing. Moreover, trouble is not caused to actuation of a transport device in case the next purchaser purchases goods after a power-source reclosing.

[0022]

[Effect of the Invention] In the automatic vending machine applied to this invention as explained above Since a control unit drops the 1st transport device to a power up and subsequently operates the 2nd transport device the goods which are on the 1st transport device or the 2nd transport device at the time of a power-source reclosing when a power

source is shut off by the 1st transport device, and it is shut off by the 2nd transport device while conveying goods while conveying goods or -- the 1st transport device and the 2nd transport device -- or it is conveyed by the 2nd transport device to goods output port. Therefore, in case the next purchaser by whom two goods are taken out in case the next purchaser from whom a purchaser cannot receive goods purchases goods purchases goods, a possibility of producing problems, such as causing trouble to actuation of a transport device, does not have after a power-source reclosing.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view of the automatic vending machine concerning the example of this invention.
[Drawing 2] It is the side elevation seen from the method of the right in the condition of having removed the right-hand side wall of a tank of the automatic vending machine of drawing 1 , and the right-hand side wall of an inner case.
[Drawing 3] It is the perspective view of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 4] It is the partial perspective view of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 5] It is the perspective view of some configuration members of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 6] It is the perspective view of some configuration members of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 7] It is the top view of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.

[Drawing 8] It is the partial perspective view of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 9] It is the partial perspective view of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 10] It is drawing showing actuation of the goods vertical transport device with which the automatic vending machine of drawing 1 is equipped.
[Drawing 11] They are the goods vertical transport device of the power up of the automatic vending machine of drawing 1 , and the control flow chart of actuation of a conveyor.
[Description of Notations]
A Automatic vending machine
1 Tank
2 Inner Case
6 Shelf Space
7 Goods Expenditure Equipment
8 Goods Stopper
9 Goods Vertical Transport Device
9k Goods saucer
10 Conveyor

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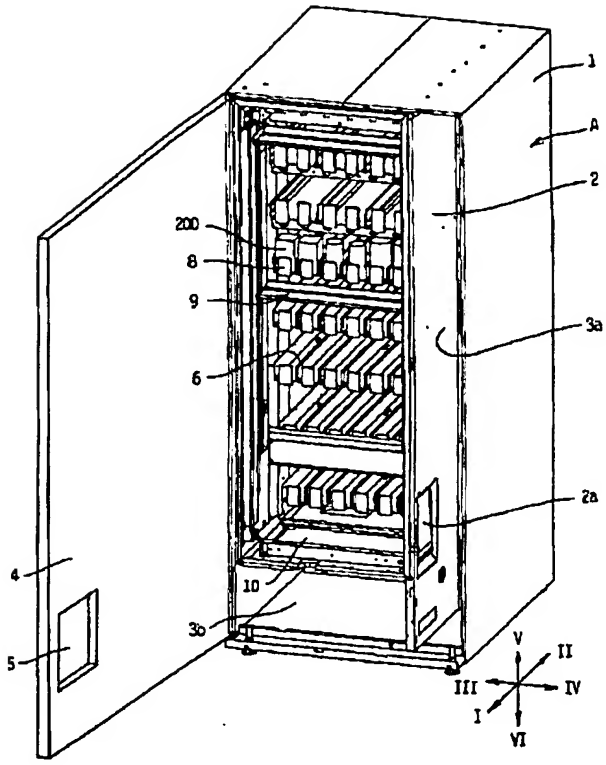
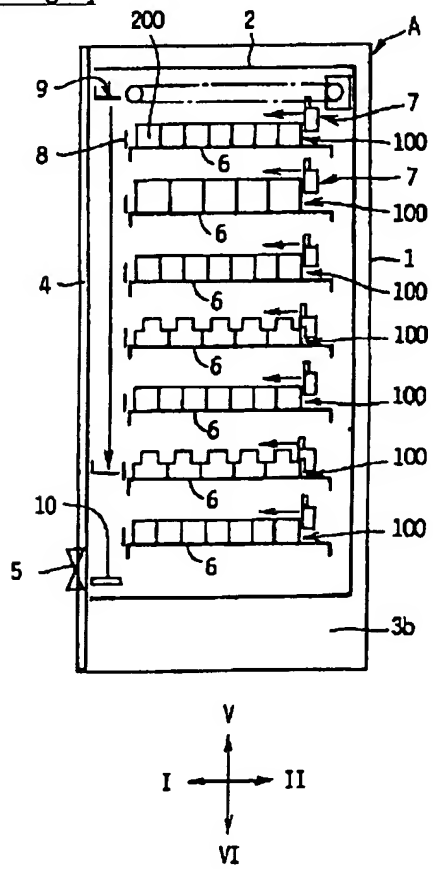
DRAWINGS

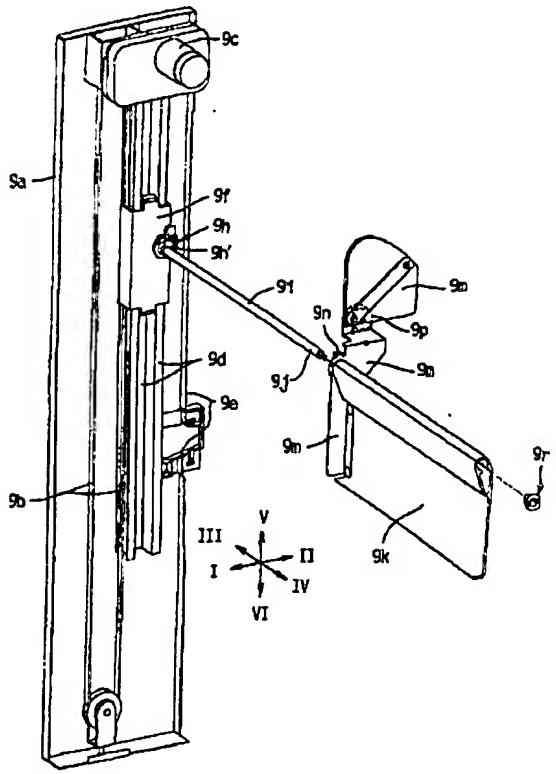
[Drawing 1]



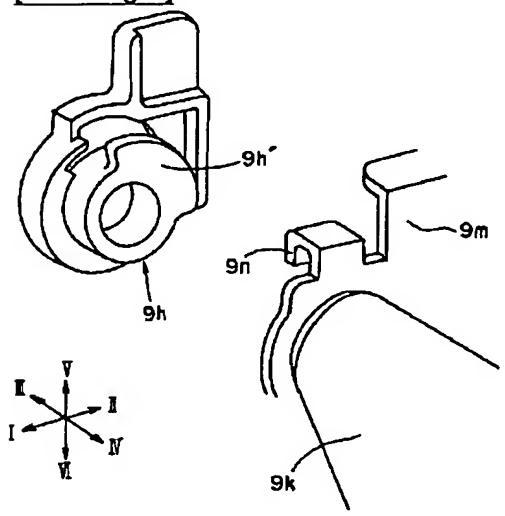
[Drawing 2]



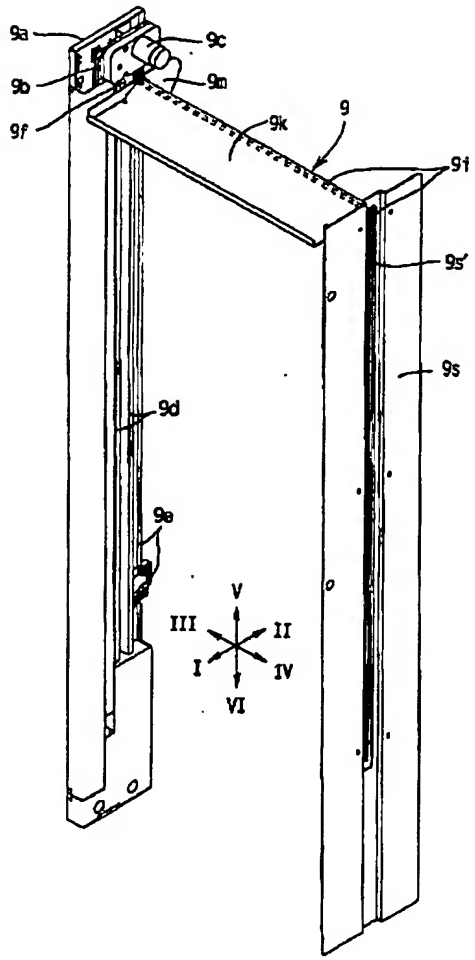
[Drawing 4]



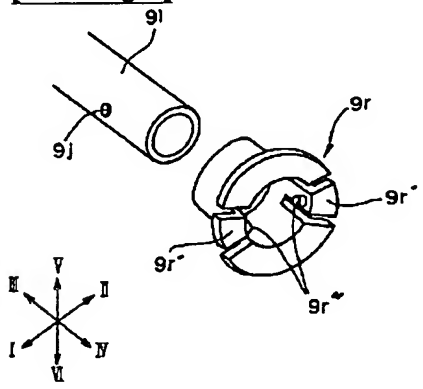
[Drawing 5]



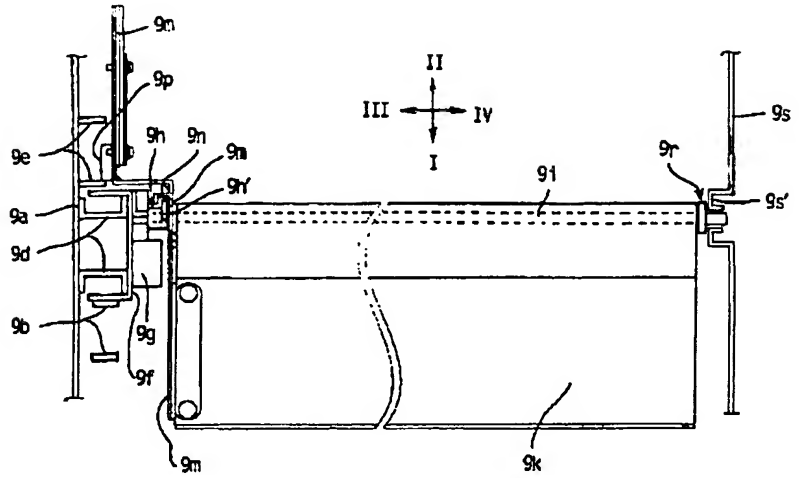
[Drawing 3]



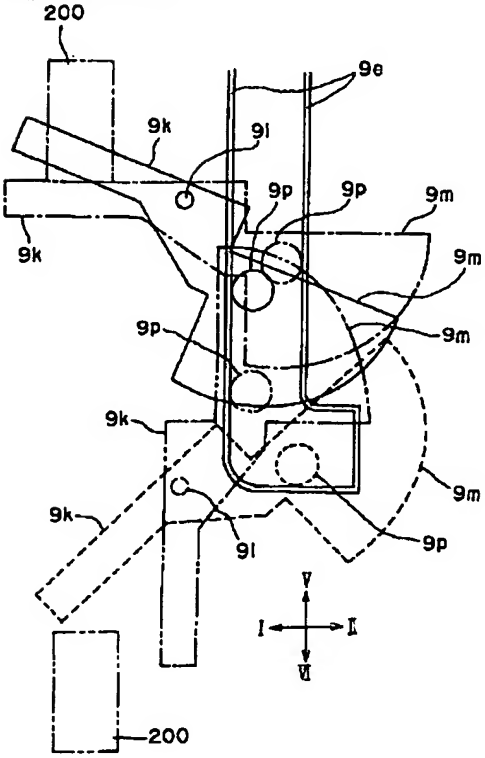
[Drawing 6]



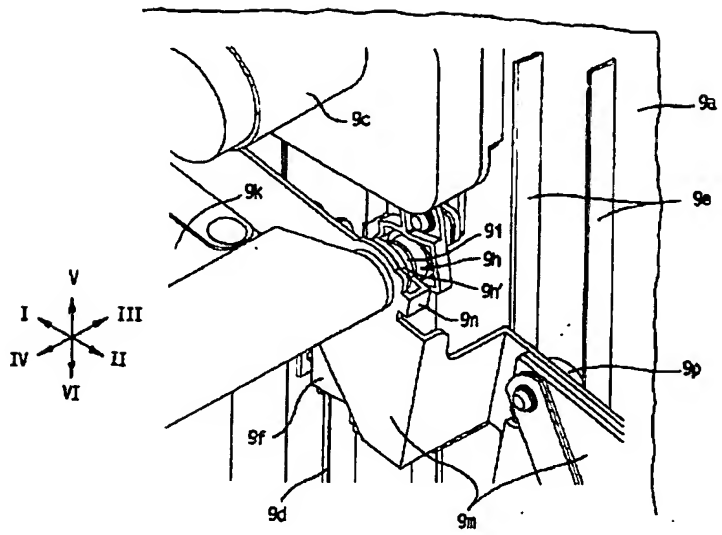
[Drawing 7]



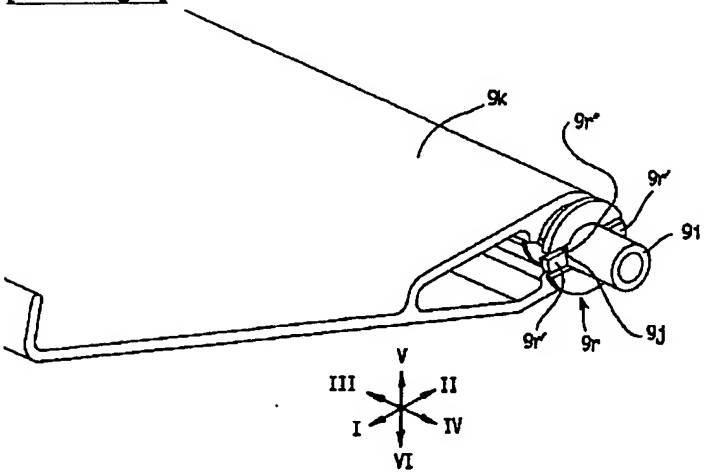
[Drawing 10]



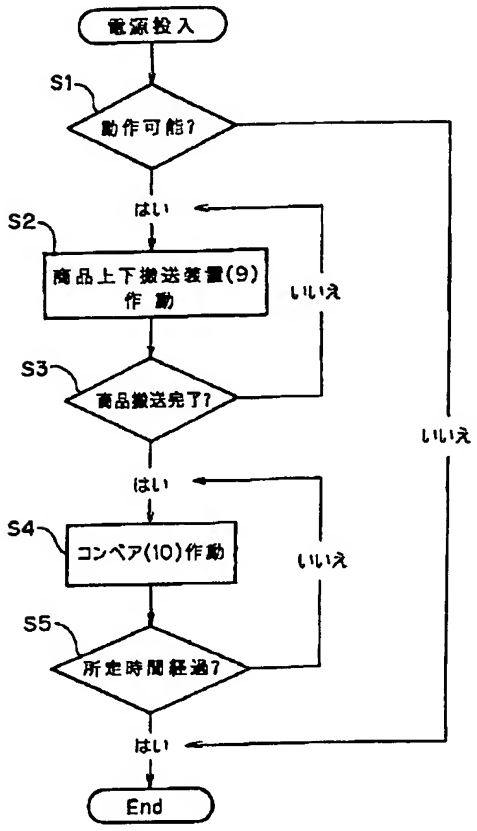
[Drawing 8]



[Drawing 9]



[Drawing 11]



[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（A）　(11)特許出願公開番号

特開平11－296727

(43)公開日　平成11年(1999)10月29日

(51)Int.Cl.⁶	識別記号	ＦＩ	
Ｇ０７Ｆ　9/00	１０７	Ｇ０７Ｆ　9/00	１０７Ａ
11/42		11/42	

審査請求　未請求　請求項の数１　ＯＬ　（全８頁）

(21)出願番号　特願平10－95526

(22)出願日　平成10年(1998)４月８日

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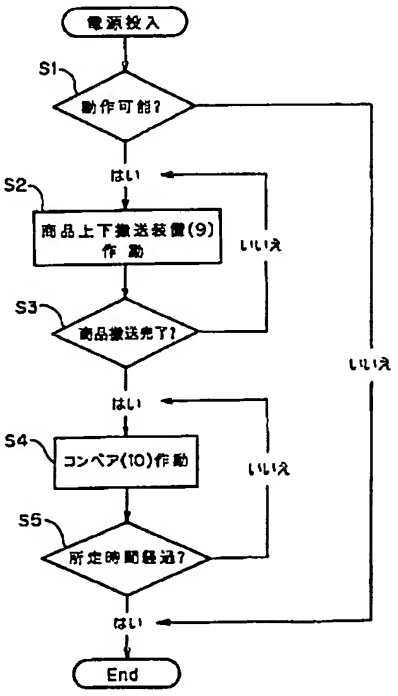
(54)【発明の名称】　自動販売機

(57)【要約】

【課題】　互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第１搬送装置と、第１搬送装置から商品を受け取って商品を商品取出口まで搬送する第２搬送装置と、商品払出し装置の作動と第１搬送装置の作動と第２搬送装置の作動とを制御する制御装置とを備える自動販売機であって、第１搬送装置で商品を搬送中、又は第２搬送装置で商品を搬送中に電源が切れた時に、電源再投入時のトラブルを生じない自動販売機を提供する。

【解決手段】　互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第１搬送装置と、第１搬送装置から商品を受け取って商品を商品取出口まで搬送する第２搬送装置と、商品払出し装置の作動と第１搬送装置の作動と第２搬送装置の作動とを制御する制御装置とを備え、制御装置は電源投入時に第１搬送装置を下降させ、次いで第２搬送装置を作動させる。



【特許請求の範囲】
【請求項1】　互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第1搬送装置と、第1搬送装置から商品を受け取って商品を商品取出口まで搬送する第2搬送装置と、商品払出し装置の作動と第1搬送装置の作動と第2搬送装置の作動とを制御する制御装置とを備え、制御装置は電源投入時に第1搬送装置を下降させ、次いで第2搬送装置を作動させることを特徴とする自動販売機。
【発明の詳細な説明】
【0001】
【発明の属する技術分野】本発明は、互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第1搬送装置と、第1搬送装置から商品を受け取って商品を商品取出口まで搬送する第2搬送装置と、商品払出し装置の作動と第1搬送装置の作動と第2搬送装置の作動とを制御する制御装置とを備える自動販売機に関するものである。
【0002】
【従来の技術】互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第1搬送装置と、第1搬送装置から商品を受け取って商品を商品取出口まで搬送する第2搬送装置と、商品払出し装置の作動と第1搬送装置の作動と第2搬送装置の作動とを制御する制御装置とを備える自動販売機においては、従来、第1搬送装置で商品を搬送中、又は第2搬送装置で商品を搬送中に電源が切れると、電源再投入時に第1搬送装置上又は第2搬送装置上に商品が残ったままになっていた。
【0003】
【発明が解決しようとする課題】第1搬送装置で商品を搬送中、又は第2搬送装置で商品を搬送中に電源が切れた時に、電源再投入時に第1搬送装置上又は第2搬送装置上に商品が残ったままになっていると、電源再投入後にも購買者が商品を受け取れない、次の購買者が商品を購入する際に2個の商品が搬出される、次の購買者が商品を購入する際に搬送装置の作動に支障を来す等の問題を生ずる。本発明は上記問題に鑑みてなされたものであり、互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第1搬送装置と、第1搬送装置から商品を受け取って商品を商品取出口まで搬送する第2搬送装置と、商品払出し装置の作動と第1搬送装置の作動と第2搬送装置の作動とを制御する制御装置とを備える自動販売機であって、第1搬送装置で商品を搬送中、又は第2搬送装置で商品を搬送中に電源が切れた時に、電源再投入時のトラブルを生じない自動販売機を提供することを目的とする。
【0004】
【課題を解決するための手段】上記課題を解決するために、本発明においては、互いに間隔を隔てて上下に積層された複数の商品棚と、商品棚から商品を払い出す商品払出し装置と、商品棚から払い出された商品を受け取って商品を下方へ搬送する第1搬送装置と、第1搬送装置から商品を受け取って商品を商品取出口まで搬送する第2搬送装置と、商品払出し装置の作動と第1搬送装置の作動と第2搬送装置の作動とを制御する制御装置とを備え、制御装置は電源投入時に第1搬送装置を下降させ、次いで第2搬送装置を作動させることを特徴とする自動販売機を提供する。本発明に係る自動販売機においては、制御装置は、電源投入時に第1搬送装置を下降させ、次いで第2搬送装置を作動させるので、第1搬送装置で商品を搬送中、又は第2搬送装置で商品を搬送中に電源が切れた時に、電源再投入時に第1搬送装置上又は第2搬送装置上にある商品は、第1搬送装置と第2搬送装置とにより、又は第2搬送装置により、商品取出口まで搬送される。従って、電源再投入後にも購買者が商品を受け取れない、次の購買者が商品を購入する際に2個の商品が搬出される、次の購買者が商品を購入する際に搬送装置の作動に支障を来す等の問題を生ずるおそれは無い。
【0005】
【発明の実施の形態】本発明の実施例に係る自動販売機を、図1～11に基づいて説明する。以下の説明において、図1～10の矢印Ⅰ、Ⅱ、Ⅲ、Ⅳ、Ⅴ、Ⅵの方向を、前方、後方、左方、右方、上方、下方と呼ぶ。図1、2に示すように、本実施例に係る自動販売機Aは、前面が開放された外箱1を備えている。外箱1内に前面が開放された内箱2が配設されている。内箱2は断熱加工されている。内箱2の右側壁下部に開口2aが形成されている。開口2aに図示しない揺動開閉式のシャッターが取り付けられている。内箱2と外箱1の右側壁との間に第1機械室3aが形成され、内箱2と外箱1の底壁との間に第2機械室3bが形成されている。外箱1の前面に、内箱2の開放された前面と第1、第2機械室3a、3bの開放された前面とを覆う透明な窓を有する揺動式の扉4が取り付けられている。扉4の右下部に商品取出口5が形成されている。商品取出口5に図示しない揺動開閉式のシャッターとマイクロスイッチとが取り付けられている。扉4の第1機械室3aに対峙する部分の上部に、図示しない商品選択釦が取り付けられている。
【0006】内箱2内に、上下に互いに間隔を隔てて7段に積層された商品棚6が配設されている。各商品棚6には、前後に延在する複数の商品列100を成して、商品200が載置されている。最上段の商品棚6に載置さ

れた各商品列１００の上方に、前後に延在する無端ベルトと無端ベルトを回転駆動するモータと無端ベルトに固定された押片とにより構成される商品払い出し装置７が配設されている。最上段の商品棚６を除く各商品棚６に載置された各商品列１００の上方に且つ直上の商品棚６の下方に、前後に延在する無端ベルトと無端ベルトを回転駆動するモータと無端ベルトに固定された押し片とにより構成される商品払い出し装置７が配設されている。各商品棚６の前端に、各商品列１００に対峙して、商品ストッパー８が取り付けられている。商品ストッパー８は、直立位置と、右方から見て反時計回りに１８０度倒れた位置との間で揺動可能に、取り付けられている。商品ストッパー８は、図示しないバネの付勢力により、無負荷時に直立している。

【０００７】商品棚６の前端と内箱２の開放端との間に、上下に移動可能な受け皿と受け皿の駆動装置により構成される商品上下搬送装置９が配設されている。商品棚６の前端と内箱２の開放端との間に、且つ最下段の商品棚６の下方に、左右に延在するコンベア１０が配設されている。

【０００８】第１機械室３ａ内の上部及び高さ方向中央部に図示しないコイン計数装置、コインロッカー等が配設され、また、商品払い出し装置７、商品上下搬送装置９、コンベア１０等の作動を制御する制御装置が配設されている。制御装置は、制御プログラムが収納されたＲＯＭ、ＲＡＭ、ＣＰＵ、Ｉ／Ｏインターフェース等により構成されている。第１機械室３ａ内の下部に且つ内箱の開口２ａの下方に図示しない商品受け棚が配設されている。第２機械室３ｂ内に図示しない冷却装置の圧縮機、凝縮器が配設され、内箱２内の最下段の商品棚６の下方に蒸発器が配設されている。

【０００９】商品上下搬送装置９の構成を、図３～図９を参照しつつ詳述する。図３、４、７、８に示すように、ガイド部材９ａが上下に延在している。ガイド部材９ａは内箱２の左壁に固定され、左壁の一部を構成している。上下に延在する無端ベルト９ｂがガイド部材９ａに取り付けられている。無端ベルト９ｂを回転駆動するモータ９ｃがガイド部材９ａの頂部に取り付けられている。上下に延在する一対の台車ガイドレール９ｄが無端ベルト９ｂに隣接してガイド部材９ａに取り付けられている。上下に延在する一対のローラーガイド９ｅが台車ガイドレール９ｄに隣接してガイド部材９ａに取り付けられている。ローラーガイド９ｅの下端は下から２番目の商品棚６の僅かに上方に位置決めされており、図３、４に示すように、ローラーガイド９ｅの下端部は、後方へ略直角に屈曲している。図４、７、８に示すように、台車ガイドレール９ｄに跨座する台車９ｆが、無端ベルト９ｂに連結されている。軸受け９ｈが台車９ｆに取り付けられている。軸受け９ｈは、図４、５、７、８に示すように、後方斜め上方へ延びる中心角が略９０度の扇状の係止片９ｈ′を有している。図３、４、７、８に示すように、左端が台車９ｆに固定された支持棒９ｉが、軸受け９ｈを貫通して水平に右方へ延在している。図４、６に示すように、支持棒９ｉの右端近傍部に、一対の小穴９ｊが向かい合って形成されている。

【００１０】図３、４、７、８に示すように、左右に延在する商品受け皿９ｋが、商品受け皿９ｋに形成された全通穴に支持棒９ｉが挿通された状態で、支持棒９ｉによって回動可能に支持されている。商品受け皿９ｋの左端に、バランスウエイト９ｍが取り付けられている。バランスウエイト９ｍの存在により、商品受け皿９ｋは、無負荷時に、図３、７、８に示すように、前縁から後縁へ向けて僅かに下方へ傾斜している。図４、５、７、８に示すように、バランスウエイト９ｍに、鉤型の係止爪９ｎが形成されている。図７、８に示すように、係止爪９ｎは係止片９ｈ′に係合している。図４に破線で示し、図７、８に実線で示すように、バランスウエイト９ｍに、左方へ突出するローラー９ｐが回動可能に取り付けられている。図７、８に示すように、商品受け皿９ｋが無負荷である時に、ローラー９ｐは、一対のローラーガイド９ｅ中の前方のローラーガイド９ｅに当接している。この結果、商品受け皿９ｋは、無負荷時に、前縁から後縁へ向けて僅かに下方へ傾斜した状態に保たれる。

【００１１】図４、６、７、９に示すように、スナップリング９ｒが配設されている。スナップリング９ｒは、円筒部とフランジ部とを有している。図６に示すように、フランジ部と円筒部の一部とに亘って、２組の対のスリットが向かい合って形成され、各対のスリットに挟まれて、狭幅の弾性部９ｒ′が形成されている。各弾性部９ｒ′の内側に突起９ｒ″が形成されている。図７、９に示すように、スナップリング９ｒの円筒部が、商品受け皿９ｋの全通穴の右端へ挿入され、前記全通穴の右端から右方へ突出する支持棒９ｉの右端部へ外嵌合している。弾性部９ｒ′の内側に形成された突起９ｒ″が、支持棒９ｉの右端近傍部に形成された小穴９ｊに嵌合して、スナップリング９ｒを支持棒９ｉに係止している。

【００１２】図３、７に示すように、ガイド部材９ａに対峙して、ガイド部材９ｓが配設され、上下に延在している。ガイド部材９ｓは、内箱２の右側壁に固定され、右側壁の一部を構成している。ガイド部材９ｓに上下に延在する凸部と凸部に形成され上下に延在する長穴とにより構成されるガイド部９ｓ′が形成されている。支持棒９ｉの右端がガイド部９ｓ′の長穴に上下に移動可能に挿通されている。

【００１３】上記構成を有する自動販売機Ａの作動を説明する。ユーザーは扉４の透明な窓から内部の商品２００を見通して所望の商品２００を選択し、次いでパネル５に形成された図示しないコイン投入口からコインを投入し、商品選択釦を押して、所望の商品２００によって構成された商品列１００を指定する。制御装置の制御の

下に、商品上下搬送装置９の商品受け皿９ｋが、最上段の商品棚６よりも上方の待機位置から下降し、所望の商品２００によって構成された商品列１００が載置された商品棚６よりも僅かに下方の高さ位置に停止する。尚、商品上下搬送装置９の商品受け皿９ｋが最上段の商品棚６よりも上方の待機位にある時、台車９ｆがガイド部材９ａに取り付けられた図示しないマイクロスイッチに当接し、当該マイクロスイッチをＯＮ状態にしている。台車９ｆが下降し、商品受け皿９ｋが待機位置から下降すると、台車９ｆと前記マイクロスイッチとの当接が解除され、前記マイクロスイッチがＯＦＦ状態になる。制御装置は、前記マイクロスイッチのＯＮ、ＯＦＦにより、商品受け皿９ｋが待機位置に在るか否かを検知する。もし何らかの原因で、商品受け皿９ｋが待機位置にいない場合には、制御装置は、商品受け皿９ｋを一旦待機位置へ戻した後、下降させる。商品受け皿９ｋの停止位置制御は、モータ９ｃに取り付けられたエンコーダの計数値と各商品棚の位置に対応するエンコーダの計数値とを比較することにより正確に行われる。

【００１４】商品受け皿９ｋが所望の商品２００によって構成された商品列１００が載置された商品棚６よりも僅かに下方の高さ位置に停止すると、制御装置の制御の下に該商品列１００の直上の商品払い出し装置７が作動し、商品列１００の最後尾に位置する商品２００に後方から当接する押し片が商品１個分の距離だけ前方へ移動し、商品列１００を商品１個分の距離だけ前方へ押し出す。最前の商品２００が商品ストッパー８を付勢するバネ力に逆らって、直立した商品ストッパー８を押し倒し、商品棚６の前縁から落下する。落下した商品２００は、商品上下搬送装置９の商品受け皿９ｋによって受け止められる。

【００１５】商品受け皿９ｋは、図１０に実線で示すように、無負荷時において、バランスウエイト９ｍの存在により、支持棒９ｉの回りに、右方から見て時計方向に回動し、ローラー９ｐが一対のローラーガイド９ｅ中の前方のローラーガイド９ｅに当接することにより、前縁から後縁へ向かって僅かに下方へ傾斜している。商品受け皿９ｋに商品２００が乗ると、商品受け皿９ｋは、図１０に一点鎖線で示すように、商品２００の重さによって、右方から見て反時計方向へ回動し、ローラー９ｐが一対のローラーガイド９ｅ中の後方のローラーガイド９ｅに当接して、略水平に延在する。この結果、商品２００は商品受け皿９ｋによって安定して支持される。図示しない光センサーによって、商品２００が商品棚６の前縁から落下した事が検知され、ひいては商品棚６から商品上下搬送装置９へ商品２００が払い出されたことが検知される。検知信号が制御装置へ送られる。

【００１６】制御装置は、光センサーから商品払出し検知信号を受信した後、商品上下搬送装置９の商品受け皿９ｋの下降を開始させる。商品受け皿９ｋは、商品２００を乗せて略水平に延在したまま下降する。商品２００の商品受け皿９ｋ上での姿勢は安定しているので、商品受け皿９ｋの下降中に、商品２００が商品受け皿９ｋから落下するおそれは無い。商品受け皿９ｋは、下から２番目の商品棚６の僅かに上方の位置まで下降すると停止する。該高さ位置において、ローラーガイド９ｅの下端部が後方へ略直角に屈曲しているので、ローラー９ｐは支えを失う。この結果、商品受け皿９ｋは、商品２００の重さにより、支持棒９ｉの回りに、右方から見て反時計回りに回動する。商品受け皿９ｋが略９０度回動すると、図１０に二点鎖線で示すように、ローラー９ｐが一対のローラーガイド９ｅ中の前方のローラーガイド９ｅに当接し、商品受け皿９ｋの回動が停止しする。後縁から前縁へ向けて略鉛直に延在する商品受け皿９ｋから商品２００が落下する。荷重を失った商品受け皿９ｋは、バランスウエイト９ｍの存在により、支持棒９ｉの回りに、右方から見て時計方向へ回動する。図１０に破線で示すように、ローラー９ｐが一対のローラーガイド９ｅ中の前方のローラーガイド９ｅの後方へ屈曲した部分に当接し、商品受け皿９ｋの回動が停止する。

【００１７】制御装置の制御の下に商品上下搬送装置９の商品受け皿９ｋが待機位置まで上昇する。上昇する際に、商品受け皿９ｋは、右方から見て時計方向へ回動し、ローラー９ｐが一対のローラーガイド９ｅ中の前方のローラーガイド９ｅの後方へ屈曲した部分に当接しつつ前方へ移動し、やがて、一対のローラーガイド９ｅ中の前方のローラーガイド９ｅの鉛直に延在する部分に当接する。この時点で商品受け皿９ｋの回動が停止し、商品受け皿９ｋは、図１０に実線で示す、無負荷時の、前縁へら後縁へ向けて僅かに下方へ傾斜した状態となる。商品受け皿９ｋは待機位置に到達した後該位置にとどまる。

【００１８】商品受け皿９ｋが下から２番目の商品棚６の僅かに上方の位置まで下降して停止した後、制御装置の制御の下にコンベア１０が所定時間作動する。商品受け皿９ｋから落下した商品２００は、コンベア１０によって受け止められ、開口２ａへ向けて搬送される。商品２００は開口２ａを通り、開口２ａの下方に配設された商品受け棚上に落下する。ユーザーは商品取出口５を介して、商品受け棚上の商品２００を取り出す。商品２００が取り出される際に、商品取出口５に取り付けられた図示しないシャッターが揺動し、図示しないマイクロスイッチが作動する。これにより、制御装置は、商品取出口が開けられたことを検知する。

【００１９】最下段の商品棚６に載置された商品２００或いは下から２段目の商品棚６に載置された商品２００が選択された場合には、商品払い出し装置７によって商品棚６から払い出された商品２００は、商品上下搬送装置９の商品受け皿９ｋを介することなく、直接コンベア１０上に落下し、コンベア１０によって商品受け棚まで

搬送され、商品取り出し口５を介して、取り出される。

【００２０】本実施例に係る自動販売機Ａにおいては、電源を投入した時に、商品上下搬送装置９の作動とコンベア１０の作動とが以下のように制御される。図１１の制御フローチャートに示すように、制御装置は、自動販売機Ａの電源が投入されると、扉４が閉じているか、商品取出口５に取り付けたシャッターが閉じているか等をチェックし、商品上下搬送装置９とコンベア１０とが作動可能であるかチェックした後（Ｓ１）、商品上下搬送装置９を作動させる。制御装置は、電源投入時に商品受け皿９ｋが待機位置に在る場合には商品受け皿９ｋを下から２番目の商品棚６の僅かに上方の位置まで下降させ、電源投入時に商品受け皿９ｋが待機位置にいない場合には商品受け皿９ｋを一旦待機位置へ戻した後、下から２番目の商品棚６の僅かに上方の位置まで下降させて、商品落下動作をさせる。商品受け皿９ｋが下から２番目の商品棚６の僅かに上方の位置まで下降したこと、ひいては商品上下搬送装置９による商品搬送が完了したことは、モータ９ｃに取り付けられたエンコーダの計数値によって検知される（Ｓ２、Ｓ３）。制御装置は、商品上下搬送装置９による商品搬送が完了した後、コンベア１０を、商品２００の搬出に十分な所定時間作動させる（Ｓ４、Ｓ５）。制御装置は、コンベア１０を作動させるのに平行して、商品受け皿９ｋを待機位置へ復帰させる。上記制御の結果、電源投入時に商品上下搬送装置９の商品受け皿９ｋに商品２００が載っていれば、商品２００は商品受け皿９ｋからコンベア１０へ移送され、コンベア１０によって商品受け棚まで搬送される。電源投入時にコンベア１０に商品２００が載っていれば、商品２００はコンベア１０によって商品受け棚まで搬送される。

【００２１】自動販売機Ａにおいては、仮に購買者による商品２００の購入中であって、商品上下搬送装置９による商品２００の搬送中、又はコンベア１０による商品２００の搬送中に電源が切れた場合であっても、購買者は、電源再投入後に商品２００を商品取り出し口５を介して取り出すことができる。また、電源再投入後に商品を購入しようとする次の商品購買者が、２個の商品を商品取り出し口５を介して取り出すことも無い。また、電源再投入後に次の購買者が商品を購入する際に搬送装置の作動に支障を来すことも無い。

【００２２】

【発明の効果】以上説明したごとく、本発明に係る自動販売機においては、制御装置は、電源投入時に第１搬送装置を下降させ、次いで第２搬送装置を作動させるので、第１搬送装置で商品を搬送中、又は第２搬送装置で商品を搬送中に電源が切れた時に、電源再投入時に第１搬送装置上又は第２搬送装置上にある商品は、第１搬送装置と第２搬送装置とにより、又は第２搬送装置により、商品取出口まで搬送される。従って、電源再投入後も購買者が商品を受け取れない、次の購買者が商品を購入する際に２個の商品が搬出される、次の購買者が商品を購入する際に搬送装置の作動に支障を来す等の問題を生ずるおそれは無い。

【図面の簡単な説明】

【図１】本発明の実施例に係る自動販売機の斜視図である。

【図２】図１の自動販売機の、外箱の右側壁と内箱の右側壁とを取り去った状態での、右方から見た側面図である。

【図３】図１の自動販売機が備える商品上下搬送装置の斜視図である。

【図４】図１の自動販売機が備える商品上下搬送装置の部分斜視図である。

【図５】図１の自動販売機が備える商品上下搬送装置の一部の構成部材の斜視図である。

【図６】図１の自動販売機が備える商品上下搬送装置の一部の構成部材の斜視図である。

【図７】図１の自動販売機が備える商品上下搬送装置の平面図である。

【図８】図１の自動販売機が備える商品上下搬送装置の部分斜視図である。

【図９】図１の自動販売機が備える商品上下搬送装置の部分斜視図である。

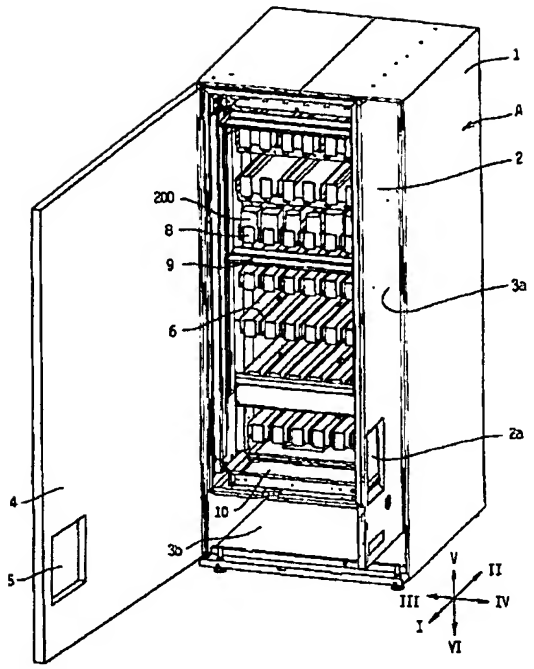
【図１０】図１の自動販売機が備える商品上下搬送装置の作動を示す図である。

【図１１】図１の自動販売機の電源投入時の商品上下搬送装置、コンベアの作動の制御フローチャートである。

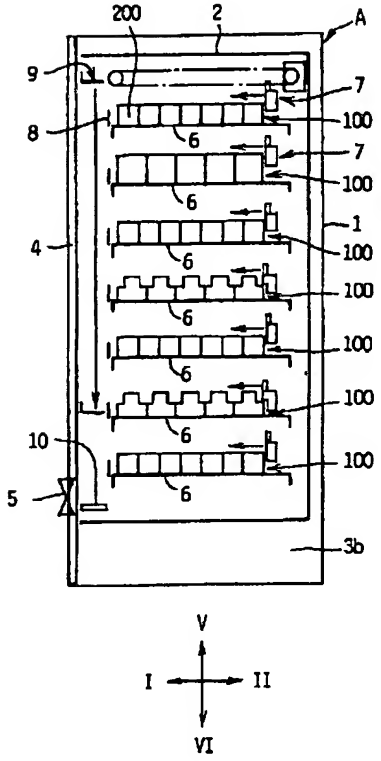
【符号の説明】

Ａ　自動販売機
１　外箱
２　内箱
６　商品棚
７　商品払い出し装置
８　商品ストッパー
９　商品上下搬送装置
９ｋ　商品受け皿
１０　コンベア

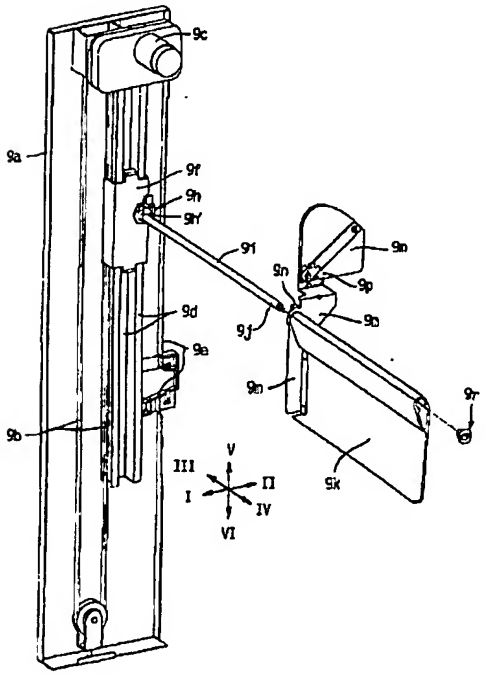
【図1】


1
A
2
200
8
9
3a
6
2a
4
10
3b
5
V
II
III
IV
I
VI

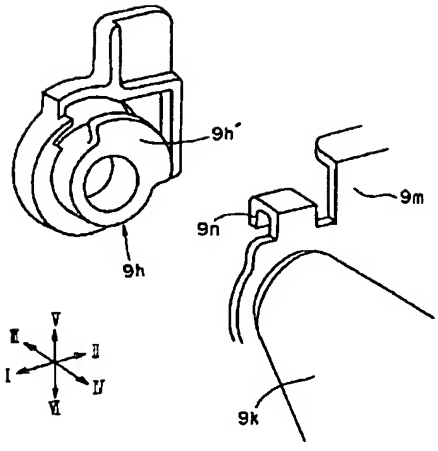
【図2】


200
2
A
9
7
100
8
6
7
100
6
1
4
100
6
100
6
100
6
100
6
10
100
6
5
3b
V
I
II
VI

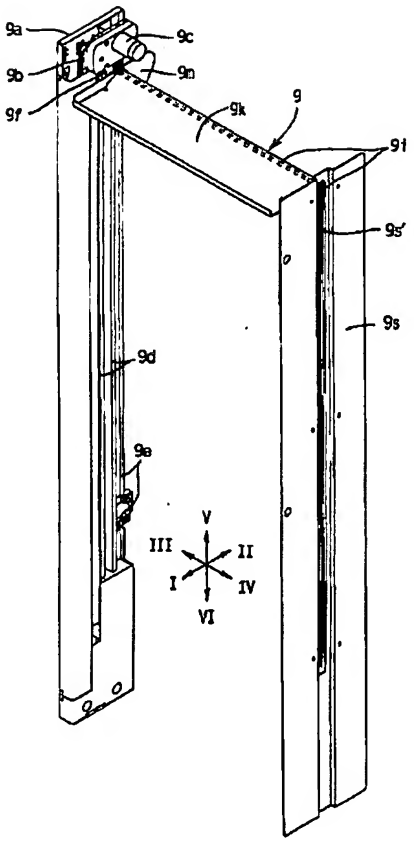
【図4】


9c
9a
9f
9h
9h'
9l
9n
9p
9d
9j
9o
9e
9m
9r
9b
9k
III
V
II
I
IV
VI

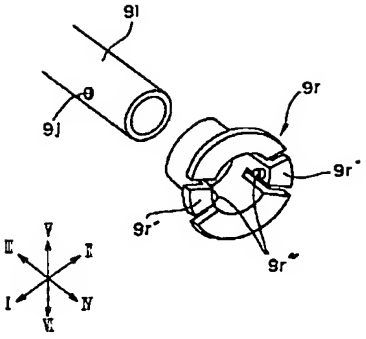
【図5】


9h'
9m
9n
9h
V
II
I
IV
VI
9k

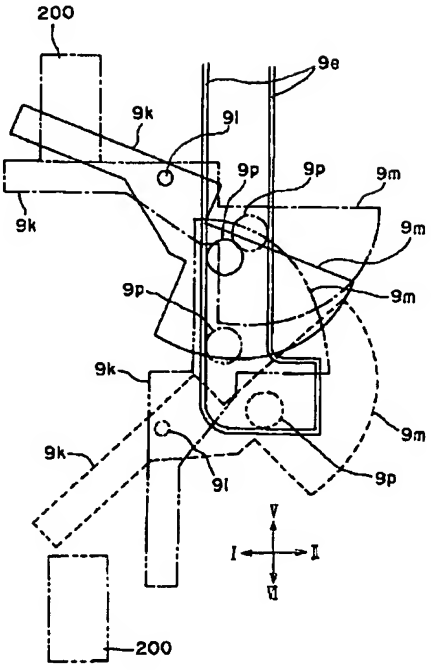
【図3】


9a
9c
9b
9n
9f
9k
9
9l
9s'
9s
9d
9e
V
III
II
I
IV
VI

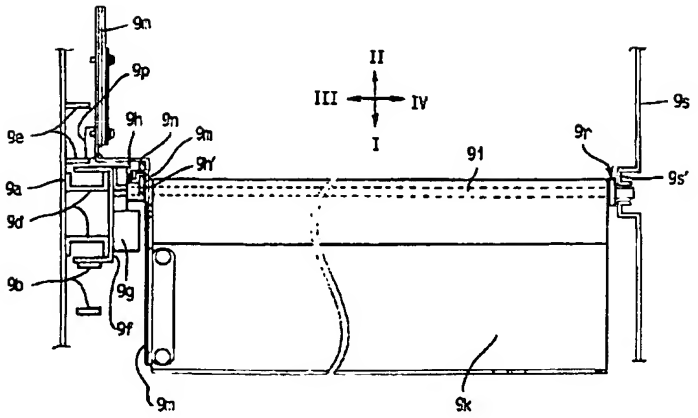
【図6】


9l
9j
9r
9r'
9r'
9r'
V
II
I
III
IV
VI

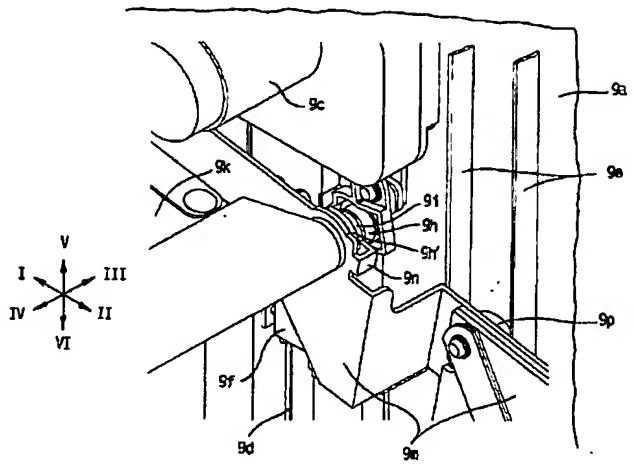
【図10】


200
9e
9k
9l
9p
9p
9m
9k
9m
9p
9m
9k
9m
9k
9l
9p
V
I
II
VI
200

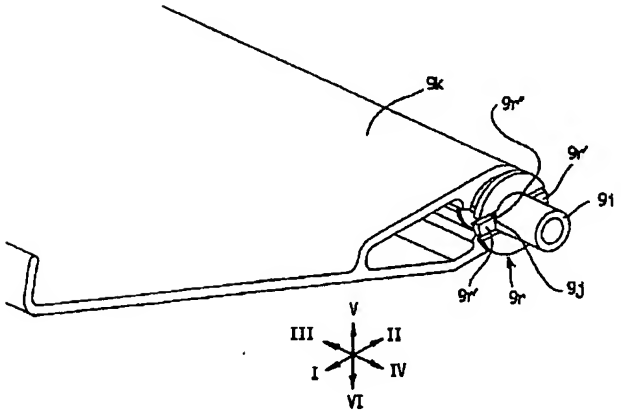
【図7】


9n
9p
9e
9h
9n
9m
9f'
9a
9d
9b
9g
9f
9n
II
III
IV
I
9s
9r
9s'
9l
9k

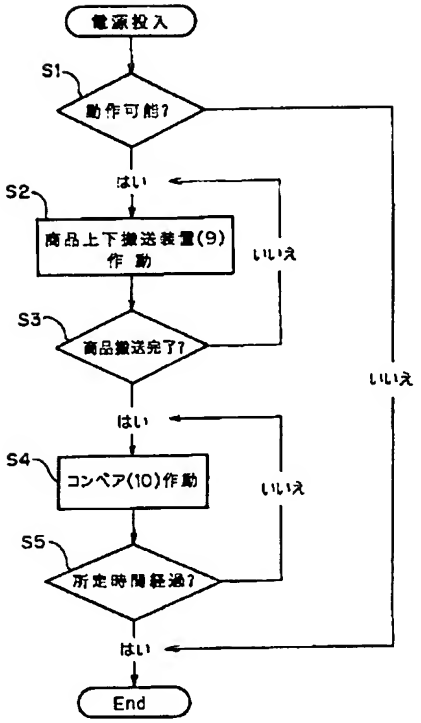
【図8】


9c
9a
9k
9e
91
9h
9f
9n
9p
9f
9d
9m
V
I
III
IV
II
VI

【図9】


9k
9r'
9r'
91
9r'
9r
9j
V
III
II
I
IV
VI

【図11】


電源投入
S1
動作可能?
はい
S2
商品上下搬送装置(9)
作動
いいえ
S3
商品搬送完了?
いいえ
はい
S4
コンベア(10)作動
いいえ
S5
所定時間経過?
はい
End